



US006381233B1

(12) United States Patent
Sunaga**(10) Patent No.: US 6,381,233 B1**
(45) Date of Patent: *Apr. 30, 2002**(54) SPREAD SPECTRUM COMMUNICATION TRANSMITTER AND RECEIVER, AND CDMA MOBILE COMMUNICATION SYSTEM AND METHOD****(75) Inventor:** Terumi Sunaga, Yokohama (JP)**(73) Assignee:** YRP Mobile Telecommunications Key Technology Research Laboratories Co., Ltd., Kanagawa (JP)**(*) Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 08/820,608**(22) Filed:** Mar. 19, 1997**(30) Foreign Application Priority Data**

Mar. 25, 2000 (JP) 8-092954

(51) Int. Cl.⁷ H04J 13/00**(52) U.S. Cl.** 370/335; 370/342**(58) Field of Search** 370/320, 335, 370/342, 441, 491, 500; 375/200, 205, 267**(56) References Cited****U.S. PATENT DOCUMENTS**

5,341,397 A	8/1994	Gudmundson	375/1
5,414,734 A *	5/1995	Marchetto et al.	375/267
5,416,797 A	5/1995	Gilhausen et al.	375/705
5,448,600 A *	9/1995	Lucas	370/342
5,471,497 A	11/1995	Zehavi	375/200
5,544,167 A *	8/1996	Lucas et al.	370/342
5,559,789 A *	9/1996	Nakano et al.	370/342
5,577,025 A *	11/1996	Skinner et al.	370/342
5,636,243 A *	6/1997	Tanaka	370/350
5,646,632 A *	7/1997	Khan et al.	370/335

FOREIGN PATENT DOCUMENTS

JP 8186558 7/1996 H04J/13/02

* cited by examiner

Primary Examiner—Douglas Olms**Assistant Examiner**—Ken Vanderpuye**(74) Attorney, Agent, or Firm**—Ladas & Parry**(57) ABSTRACT**

A transmitter used in a CDMA mobile communication system includes a pilot channel transmit unit which intermittently transmits a pilot signal in a spread spectrum formation, and traffic channel transmit units which respectively transmit data signals in respective traffic channels.

3 Claims, 16 Drawing Sheets